REMARKS

Claims 1-28, all the claims pending in the application, stand rejected on prior art grounds. Applicants respectfully traverse these rejections based on the following discussion.

I. The Prior Art Rejections

Claims 1-4, 6, 8-11, 13, 15-18, 20, 22-25 and 27 stand rejected under 35 U.S.C. §102(e) as being anticipated by Childers, et al. (U.S. Patent No. 6,877,117), hereinafter referred to as Childers. Claims 5, 12, 19 and 26 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Childers, in view of Bartlett et al. (U.S. Patent No. 3,761,882), hereinafter referred to as Bartlett. Claims 7, 14, 21 and 28 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Childers in view of Porter et al. (U.S. Patent No. 5,263,032), hereinafter referred to as Porter. Claims 1, 8, 15, and 22 stand rejected under 35 U.S.C. §102(b) as being anticipated by Avizienis (U.S. Patent No. 3,517,171). Applicants respectfully traverse these rejections based on the following discussion.

The claimed invention provides a self-monitoring and self-correcting integrated circuit device and a method of continuously monitoring and adjusting the operation of the integrated circuit device. In the rejection, the Office Action argues that Childers teaches a self-monitoring and self-correcting integrated circuit device comprising a self-testing controller adapted to periodically perform performance self-testing on the integrated circuit device. In addition, the Office Action argues that Childers teaches a processor adapted to adjust parameters of the integrated circuit device. Unlike the claimed

invention, however, the optical signal receiver in Childers only tests for errors in the *signal* being processed by the circuit; it does not test the *circuit itself.* Furthermore, the circuit in Childers is temporarily changed to compensate for errors in the signal being processed by the circuit; permanent changes to the circuit are not made and recorded to compensate for failed portions of the circuit. The Office Action also asserts that Avizienis discloses adjusting parameters of the integrated circuit device. However, Avizienis merely discloses switching off power of a faulty unit and replacing the unit if the fault persists; the parameters of the integrated circuit device are not adjusted. Therefore, as explained in greater detail below, Applicants respectfully submit that the prior art of record does not teach or suggest the claimed invention.

The Office Action argues that Childers mentions that a threshold is adjusted until an acceptable decision threshold and a usable range has been determined. Further, the Office Action asserts that "[o]nce the acceptable threshold is reached there is no more need to adjust the parameters and the circuit is left to operate at the acceptable parameters. Hence, the last modification is **permanent**" (Office Action, p. 2, para. 4 – p. 3, para. 1 (emphasis added)).

Applicants respectfully disagree with such a conclusion. The Office Action asserts that if there is no present need to adjust the parameters, then the previous modification to the parameters somehow becomes permanent; however, the Office Action fails to provide any logical support for such a conclusion. The Office Action does not cite any support within Childers to maintain its assertion that a modification becomes permanent merely because the parameters are currently acceptable.

Moreover, Applicants submit that the mere fact that an acceptable threshold is reached does not mean that the parameters will never become unacceptable in the future. If the parameters later become unsatisfactory, further modifications will be performed. Thus, the previous modification to the parameters (when the acceptable threshold was previously met) would not permanent. In other words, Applicants submit that just because there may not be a *present* need to adjust the parameters does not mean that the parameters will never be modified again. Thus, it is unreasonable to interpret the parameter adjustments of Childers as being permanent. Such an interpretation of the term "permanent" would render Applicants' claim language meaningless.

Office Action argues that a receiver transmits and receives a signal being tested by the method of Childers; therefore, the receiver itself is being tested. Specifically, the Office Action asserts that "once the signal is being tested, the circuit receiving and transmitting it is also being tested" (Office Action, p. 3, para. 2).

Applicants respectfully disagree with such a conclusion. Specifically, Applicants submit that Childers teaches checking the signal for errors; the circuit itself is not checked. Moreover, Childers teaches correcting the signal, the circuit is not corrected.

As discussed in column 1, lines 30-41 of Childers, receivers are constructed with the goal of *achieving an acceptable BER* (bit error rate), which is the ratio of the number of *incorrectly received bits* to the total number of received bits. Typically, this is *achieved by adjusting and fixing the decision threshold of a comparator* within the receiver while providing a well-known optical test signal at the comparator data input. The decision threshold is a reference voltage against which the strength of a received

signal is compared. If the received signal is above the decision threshold, it is interpreted as being "on", but if the received signal is below the decision threshold, it is interpreted as being "off".

Conversely, the claimed invention checks for and corrects errors in the integrated circuit itself. More specifically, as described in paragraph 0005 of Applicants' disclosure, a method and apparatus for autonomously self-monitoring and self-adjusting the operation of an integrated circuit device is provided. Embodiments of the invention periodically perform performance self-testing on the integrated circuit device throughout the integrated circuit device's useful life. The invention also evaluates whether results from the self-testing are within acceptable limits and self-adjusts parameters of the integrated circuit device until the results from the self-testing are within the acceptable limits.

Therefore, contrary to the position taken in the Office Action, Applicants submit that Childers does not disclose a self-monitoring and self-correcting integrated circuit device. Rather, it is the signal of Childers that is checked for errors, not the circuit itself; and, it is the signal that is corrected, not the circuit itself.

The Office Action argues that Childers teaches a self-monitoring and self-correcting integrated circuit device comprising a self-testing controller adapted to periodically perform performance self-testing on the integrated circuit device; and a processor adapted to adjust parameters of the integrated circuit device (Office Action, p. 3, para. 6 – p. 4, para. 1). Furthermore, the Office Action argues that Childers teaches a method of monitoring and adjusting the operation of the integrated circuit device,

comprising periodically performing testing on the integrated circuit device; and adjusting parameters of the integrated circuit device (Office Action, p. 6, para. 5).

In support for these arguments, the Office Action cites Figure 2 and column 5, lines 15-25 of Childers, wherein the Office Action argues that the control circuit 22 of Childers is analogous to the self-testing controller of the claimed invention. Moreover, the Office Action argues that the digital to analog converter 42 of Childers is analogous to the processor of the claimed invention. More specifically, the portion cited by the Office Action discloses a comparator 16 that receives an analog data input on a line 28 and a decision threshold input on a line 44. The control circuit 22 generates the decision threshold, which is coupled to the comparator decision threshold input port on the line 44.

Unlike the claimed invention, however, the optical signal receiver in Childers only tests for errors in the *signal* being processed by the circuit; it does not test the *circuit itself*. Furthermore, the circuit in Childers is temporarily changed to compensate for errors in the signal being processed by the circuit; permanent changes to the circuit are not made and recorded to compensate for failed portions of the circuit.

As further explained in column 2, lines 20-53 of Childers, the invention is organized about the concept of providing an optical receiver configuration that adjusts a decision threshold that reduces bit error rate (BER). Specifically, the optical receiver includes a photodetector that converts an optical signal received from a fiber optic network to an electrical input data signal. A comparator is provided that compares the electrical input data signal to a decision threshold signal to provide a digital output data signal. Further, an error correction and detection circuit detects errors in the digital

output data signal and provides an error calculation signal representative of the detected errors in the data output from the comparator. Based on the error calculation signal, a control circuit modifies the comparator decision threshold and, preferably, a rate of comparison threshold adjustment to reduce the BER of the receiver.

However, nothing within Childers teaches testing an integrated circuit device itself for errors; the optical signal receiver in Childers only tests for errors in the signal being processed by a circuit. Furthermore, nothing within Childers teaches making and recording permanent changes to the circuit to compensate for failed portions of the circuit; the circuit is temporarily changed to compensate for errors in the signal being processed by the circuit.

Thus, it is Applicants' position that Childers, neither individually or in combination with Bartlett and/or Porter, does not teach or suggest the claimed feature of "a self-testing controller adapted to periodically perform performance self-testing of said integrated circuit device ... and a processor adapted to permanently [self-]adjust parameters of said integrated circuit device" as defined by independent claims 1 and 8; or, "periodically performing performance [self-]testing of said integrated circuit device ... and [self-]adjusting parameters of said integrated circuit device" as defined by independent claims 15 and 22.

In addition, the Office Action argues that Avizienis discloses adjusting parameters of the integrated circuit device until the results from the testing are within acceptable limits (Office Action, p. 18, para. 1).

In support for this contention, the Office Action cites column 2, lines 44-45 and the abstract of Avizienis, which discloses a computer system subdivided into several replaceable functional units, wherein each functional unit performs a major function of the system. The system further includes a Control and Diagnostic Unit (CDU) which monitors the units for faults and "*replaces* a faulty unit by switching off its power and switching on power to its *replacements*" (Avizienis abstract, emphasis added). Thus, the system is "subdivided into several *replaceable* functional units" (Avizienis, col. 2, lines 53-54, emphasis added). Accordingly, "[w]hen a fault is detected, the CDU *stops* the program and resumes it at a previous rollback point indicated on the computer program. The program contains numerous rollback points along it, at which the computations can readily be resumed. If the fault persists, the faulty unit is *replaced*" (Avizienis abstract, emphasis added). The Office Action also references item 152 of Figure 5, which illustrates a "POWER SWITCH" for switching off power to a faulty unit.

Therefore, Applicants submit that Avizienis does not teach adjusting parameters of the integrated circuit device as defined by independent claims 1, 8, 15, and 22. Instead, Avizienis merely discloses switching off power of a faulty unit and replacing the unit if the fault persists.

To the contrary, as discussed in paragraph 0017 of Applicants' disclosure, the parameter processor 126 adjusts the parameters by, for example, altering the voltage supplied to portions of the integrated circuit device. Thus, for example, the parameter processor 126 can activate electronic fuses (efuses) 128 in a bank to permanently change the parameters of the voltage produced by voltage regulators 116 (e.g., by affecting the

voltage reference module 118). This structure can also include permanent storage 130 (e.g., ROM internal or external to the microprocessor 114) adapted to maintain a history of adjustments made to the parameters by the processor. This storage 130 can be accessed (e.g., read or uploaded) later to gather statistics regarding common failures of specific designs.

Furthermore, as discussed in paragraph 0020 of Applicants' disclosure, the 0020, the invention is not limited to merely adjusting the voltage, and embodiments of the invention can also adjust a number of different parameters such as the delay (by engaging or disengaging various latches, again through the use of fuses), processing speed (by adjusting the various multipliers), thermal cooling required (by adjusting the integrated circuits fan speed), repair initiation (by engaging, for example, spare array redundant structures), etc.

Therefore, it is Applicants' position that Avizienis fails to disclose adjusting parameters of the integrated circuit device as defined by independent claims 1, 8, 15, and 22. Instead, Avizienis merely discloses switching off power of a faulty unit and replacing the unit if the fault persists. Accordingly, Applicants submit that Avizienis does not teach the claimed feature of "a processor adapted to permanently [self-]adjust parameters of said integrated circuit device" as defined by independent claims 1 and 8; and, "[self-]adjusting parameters of said integrated circuit device" as defined by independent claims 15 and 22.

Therefore, it is Applicants' position that the prior art of record does not teach or suggest many features defined by independent claims 1, 8, 15, and 22. Further, it is

Applicants' position that dependent claims 2-7, 9-14, 16-21, and 23-28 are similarly patentable, not only because of their dependency from a patentable independent claims, but also because of the additional features of the invention they defined. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections.

II. Formal Matters and Conclusion

With respect to the rejections to the claims, the claims have been amended, above, to overcome these rejections. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections to the claims.

In view of the foregoing, Applicants submit that claims 1-28, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0456.

Respectfully submitted,

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